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## APPOINTMENTS

### **Texas A&M University**

Associate Dean for Research, College of Science (1/2017 – present)  
D. Wayne Goodman Professor of Chemistry (9/2019 – present)  
Professor, Materials Science and Engineering, 9/2012 – present  
Associate Professor of Chemistry, 8/2005 – 8/2012 (tenured, 9/2009)  
Director, TAMU Materials Characterization Facility (9/1/2013 – 8/31/2017)

### **National Institute of Standards and Technology**

Research Chemist, 8/2002 – 8/2005

### **The City University of New York, College of Staten Island and The Graduate Center**

Associate Professor of Chemistry, 2/2002 – 8/2002 (tenured, 2/2002)  
Assistant Professor of Chemistry, 9/1996 – 1/2002

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## EDUCATION

Harvard University, Post-doctoral Fellow, 1995-1996  
University of California at Berkeley, Ph.D. Chemistry, 1995  
University of Texas at Austin, B.S. Chemistry, 1990

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## RESEARCH BACKGROUND

### **Texas A&M University (8/2005 – present)**

Research in nanoscale materials and device design, molecular/organic electronics, single molecule devices, molecular forces, nanofabrication via self-assembly and scanning probe lithography, plasmonics, biopolymer materials, plant surfaces, nanotribology.

### **National Institute of Standards and Technology (8/2002 – 8/2005)**

Surface and Microanalysis Science Division, Chemical Science and Technology Laboratory  
Research in nanoscale materials and device design and molecular electronics metrology, single molecule devices, molecular forces, nanofabrication via self-assembly and probe lithography.

### **The City University of New York, College of Staten Island and The Graduate Center (8/1996 – 8/2002)**

Surface chemistry, applications of atomic force microscopy (AFM) to biopolymer materials, plant surfaces, nanotribology, molecular forces and single bond energetics, colloidal interactions, nanoscale materials and devices, molecular electronics, nanofabrication.

### **Harvard University (8/1995 – 8/1996)**

Investigations of the tribochemistry of lubricant additives on Fe surfaces.  
Research Advisor: Professor Cynthia M. Friend

### **University of California at Berkeley (6/1990 – 8/1995)**

Investigations of the fundamental properties of surface chemical bonding and reactivity at defects on metal surfaces.  
Thesis Advisor: Professor Gabor A. Somorjai

### **University of Texas at Austin (8/1986 – 6/1990)**

Investigations of the phototchemistry and photophysics of chromophore doped polymers.  
Research Advisor: Professor Stephen E. Webber

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## AWARDS

University-Level Association of Former Students Distinguished Achievement Award for Teaching (2017)

Presidential Award from the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE) for Service to the STEM Community (2015)

College-Level Association of Former Students Distinguished Achievement Award for Teaching (2013)

Fellow of the Royal Society of Chemistry (elected 2012)

Netsch Instruments Frank Giblin Memorial Award in Polymer Analysis (Society for Plastics Engineers – Polymer Analysis Division, 2001)

Feliks Gross Endowment Award for Outstanding Scholarship (CUNY Academy, 2001)

Research Corporation Research Innovation Award (1998)

CUNY-CSI Research Released Time Award (1998 & 1999)

CUNY-CSI Junior Faculty Summer Research Fellowship (1997)

Robert A. Welch Research Fellowship (1987-1990)

Robert A. Welch Scholar in Chemistry (1986-1990)

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## PUBLICATIONS (112 total, Google Scholar h-index = 42, as of 8/29/2019)

ORCID: 0000-0002-6244-5000

### Articles

#### **In preparation (drafts available of each)**

A. Wan, H. Fu, D.E. Bergbreiter and J.D. Batteas, "Morphology Studies of Wettability-Responsive Surfaces Prepared by Covalent Layer-by-Layer Assembly," *to be submitted to Langmuir*.

J. Chen, Y.-H. Chan, T. Yang, Q. Liu, A. Pravitasari, and J.D. Batteas, "Photooxidation Kinetics of Thiol Capped CdSe QDs," *to be submitted to Nanoscale*.

A. Wan, C.-Y. Chang, Z. Levin, Q. Liu, J. Wheeler, J.C. Grunlan and J.D. Batteas, "Self-Assembly and Photoconductivity of Porphyrin Nanofibers," *to be submitted to Chemistry of Materials*.

F. Wu, Z. Liu, N. Hawthorne, M. Chandross, N. Argibay, J.F. Curry and J.D. Batteas, "Coherent Heterostructures in Mechanically Exfoliated MoS<sub>2</sub> Monolayers on Au(111), *to be submitted to ACS Nano*

### **2019**

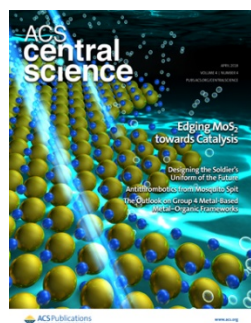
S. Skiles, A. Wan, H. Fu, A.L. Allen, M.B. Elinski, J.D. Batteas and D.E. Bergbreiter, "Solute and Temperature Responsive Smart Membranes Formed by Covalent Layer-by-Layer Assembly," Book Chapter in *Smart Membranes* (2019) pp. 185-201. ed. Liang-Lin Chu, Royal Society of Chemistry ISBN 978-1-78801-243-0

"Method and Device for Quantitative Control of Force in Mechanochemical Reactors," J.R. Felts, J.D. Batteas, S. Raghuraman, and T. Reyes. US Patent Application No. 62/806,376. – filed 2/15/19

## **2018**

N.V.S.D.K. Bhupathiraju, M. Sayeedi, W. Rizvi, S. Singh, J.D. Batteas and C.M. Drain, "Practical, High-yield Synthesis of Thiol-terminated Diacetylenes for Formation of Conductive Monolayers," *Tetrahedron Lett.* **40** (2018) 3629-3631.

D. Banerjee, C.E. Deckard III, M.B. Elinski, M.L. Buzbee, W. Wei Wang, J.D. Batteas and J.T. Sczepanski, "Plug-and-Play Approach for Preparing Chromatin Containing Site-Specific DNA Modifications: The Influence of Chromatin Structure on Base Excision Repair," *J. Am. Chem. Soc.* **140** (2018) 8260–8267.



J. Gonzales, N.V.S.D.K. Bhupathiraju, D. Hart, M. Yuen, M.P. Sifuentes, B. Samarxhiu, M. Maranan, N. Berisha, J.D. Batteas and C.M. Drain, "One-Pot Synthesis of Four Chlorin Derivatives by a Divergent Ylide," *J. Org. Chem.*, **83** (2018) 6307–6314.

A. Parija, Y.-H. Choi, Z. Liu, J.L. Andrews, L.R. De Jesus, S.C. Fakra, M. Al-Hashimi, J.D. Batteas, D. Prendergast and S. Banerjee, "Mapping Catalytically Relevant Edge Electronic States of MoS<sub>2</sub>," *ACS Cent. Sci.*, **4** (2018) 493–503. (Cover Article)

A. Pravitasari, M. Negrito, K. Light, W.-S. Chang, S. Link, M. Sheldon and J.D. Batteas, "Using Particle Lithography to Tailor the Architecture of Au Nanoparticle Plasmonic Nanoring Arrays," *J. Phys. Chem. B* **122** (2018) 730-736.

## **2017**

H. Jin, B. Baek, D. Kim, F. Wu, J.D. Batteas, J. Cheon and D.H. Son, "Effects of Direct Solvent-Quantum Dot Interaction on the Optical Properties of Colloidal Monolayer WS<sub>2</sub> Quantum Dots," *Nano Lett.* **17** (2017) 7471-7477.

A. Pawlicki, A. Bilan, M. Jurow, C.M. Drain and J.D. Batteas, "The Influence of Nearest-Neighbor Interactions and Assembly Dynamics on the Transport Properties of Porphyrin Supramolecular Assemblies on Au (111)," *Faraday Discussions* **204** (2017) 349-366.

C.J. Chalker, H. An, J.A. Zavala, A. Parija, S. Banerjee, J.L. Lutkenhaus and J.D. Batteas, "Fabrication and Electrochemical Performance of Structured Mesoscale Open Shell V<sub>2</sub>O<sub>5</sub> Networks," *Langmuir* **33** (2017) 5975-5981.

S.R. Kwon, M.B. Elinski, J.D. Batteas and J.L. Lutkenhaus, "Robust and Flexible Aramid Nanofiber/Graphene Layer-by-Layer Electrodes," *ACS Appl. Mater. Interfaces* **9** (2017) 17125-17135.

S. Raghuraman, M. B. Elinski, J. D. Batteas and J. R. Felts. "Driving Surface Chemistry at the Nanometer Scale Using Localized Heat and Stress," *Nano Lett.* **17** (2017) 2111-2117.

M.B. Elinski, Z. Liu, J.C. Spear and J.D. Batteas, "2D or not 2D? The impact of Nanoscale Roughness and Substrate Interactions on the Tribological Properties of Graphene and MoS<sub>2</sub>," *J. of Phys. D: Appl. Phys.* **50** (2017)103003.

M.B. Elinski, B.D. Menard, Z. Liu and J.D. Batteas, "Adhesion and Friction at Graphene/Self-Assembled Monolayer Interfaces Investigated by Atomic Force Microscopy," *J. Phys. Chem. C* **121** (2017) 5635-5641.

## **2016**

C. Xu, A. Wan, X. Gong, N.V.S.D.K. Bhupathiraju, J.D. Batteas and C.M. Drain, *J. of Porphyrins and Phthalocyanines* **20** (2016) 439-443.

A. Pawlicki, E. Avery, M. Jurow, B. Ewers, A. Vilan, C.M. Drain and J.D. Batteas, "Studies of the Structure and Phase Transitions of Nano-confined Petanedithiol and its Applications in Directing Hierarchical Molecular Assemblies on Au(111)," *J. of Physics: Cond. Matter* **28** (2016) 094013.

N.V.S.D.K. Bhupathiraju, W. Rizvi, J.D. Batteas and C.M. Drain, "Fluorinated Porphyrinoids as Efficient Platforms for New Photonic Materials, Sensor and Therapeutics," *Organic and Biomolecular Chemistry*, **14** (2016) 389-408. (Cover Article)



## **2015**

J.C. Spear, J.P. Custer and J.D. Batteas, "Frictional Properties of Graphene on Silica Surfaces with Nanoscale Roughness," *Tribology and Lubrication Technology* **71** (2015) 40-43.

A.E. Schuckman, B.W. Ewers, L.H. Yu, J.P.C. Tomé, L.M. Pérez, C.M. Drain, J.G. Kushmerick, and J.D. Batteas, "Unveiling how Nearest-Neighbor Interactions Alter Charge Transport Mechanisms in Molecular Assemblies of Porphyrins on Surfaces," *J. Phys. Chem. C* **119** (2015) 13569-13579.

J.C. Spear, J.P. Custer and J.D. Batteas, "The Influence of Nanoscale Roughness and Substrate Chemistry on the Frictional Properties of Single and Few Layer Graphene," *Nanoscale* **7** (2015) 10021-10029.

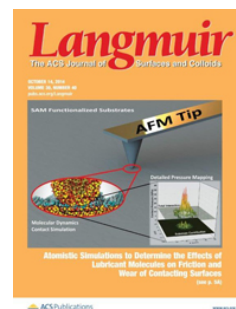
J.C. Spear, B.W. Ewers and J.D. Batteas, "2D-Nanomaterials for Controlling Friction and Wear at Interfaces," *10 Nano Today* (2015) 301-314.

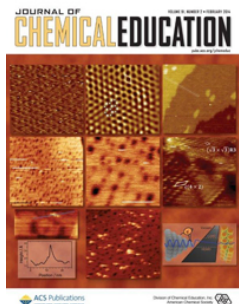
## **2014**

Q. Liu, A. Díaz, A. Prosvirin, Z. Luo and J.D. Batteas, "Shape-Controlled Synthesis of Nanopyramids and Nanoprisms of Nickel Sulfide (Ni<sub>3</sub>S<sub>4</sub>)," *Nanoscale* **6** (2014) 8935-8942.

B.W. Ewers and J.D. Batteas, "The Role of Substrate Interactions in the Modification of Surface Forces by Self-assembled Monolayers," *RSC Advances* **4** (2014) 16803-16812.

B.W. Ewers and J.D. Batteas, "Utilizing Atomistic Simulations to Map Pressure Distributions and Contact Areas in Molecular Adlayers within Nanoscale Surface-Asperity Junctions: A Demonstration with Octadecylsilane Functionalized Silica Interfaces," *Langmuir* **30** (2014) 11897-11905. (Cover Article)





B.W. Ewers, A.E. Schuckman and J.D. Batteas, "Why Did the Electron Cross the Road? A Scanning Tunneling Microscopy (STM) Study of Molecular Conductance for the Physical Chemistry Lab," *J. Chem. Educ.* **91** (2014) 283-290. (Cover Article)

## 2013

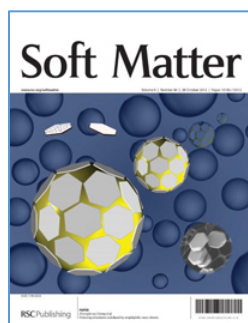
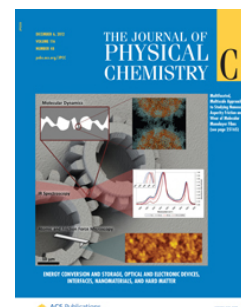
Y. Park, A. Pravitari, J. Raymond, J.D. Batteas and D.-H. Son, "Suppression of Quenching in Plasmon-Enhanced Luminescence via Rapid Intra-particle Energy Transfer in Doped Quantum Dots," submitted to *ACS Nano* **7** (2013) 10544-10551.

A. Diaz, B.M. Mosby, V.I. Bakhmutov, A.A. Marti, J.D. Batteas, and A. Clearfield, "Self-Assembled Monolayers Based Upon a Zirconium Phosphate Platform," *Chem. Mater.* **25** (2013) 723-728.

V. Saxena, A. Diaz, A. Clearfield, J.D. Batteas, and M.D. Hussain, "Zirconium Phosphate Nanoplatelets: A Biocompatible Nanomaterial for Drug Delivery to Cancer," *Nanoscale* **5** (2013) 2328-2336.

## 2012

B.W. Ewers and J.D. Batteas, "Impact of Nanoscale Roughness on Alkylsilane Self-Assembled Monolayer Formation and Structure Examined by Molecular Dynamics Simulation," *J. Phys. Chem. C* **116** (2012), 25165-25177. *Invited Feature Article – Cover Article*



A.F. Mejia, A. Diaz, S. Pullela, Y.-W. Chang, M. Simonetty, C. Carpenter, J.D. Batteas, M.S. Mannan, A. Clearfield, and Z. Cheng, "Picking Emulsions Stabilized by Amphiphilic Nano-sheets," *Soft Matter* **8** (2012) 1245-10253. (Cover Article)

A. Mijalis, H. Fu, Hui, C. Agosto, J.D. Batteas and D.E. Bergbrieter "Reversible Changes of Solution pH Resulting from Changes in Thermo-responsive Polymer Solubility," *J. Am. Chem. Soc.* **134** (2012) 7378-7383.

A. Allen, K. Tan, H. Fu, J.D. Batteas and D.E. Bergbreiter, "Solute- and Temperature-Responsive "Smart" Grafts and Supported-Membranes Formed by Covalent Layer-by-Layer Assembly," *Langmuir* **28** (2012) 5237-5242.

A. Díaz, V. Saxena, J. González, A. David, B. Casañas, C. Carpenter, J.D. Batteas, J.L. Colón, A. Clearfield and M.D. Hussain, "Zirconium Phosphate Nano-platelets: A Novel Platform for Drug Delivery in Cancer Therapy," *Chem. Comm.* **48** (2012) 1754-1756.

## 2011

A. Aggarwal, M. Qureshy, J. Johnson, J.D. Batteas, C. M. Drain, D. Samaroo, "Responsive Porphyrinoid Nanoparticles: Development and Applications," *J. Porph. and Phthal.* **15** (2011) 338-349.

S. Singh, A. Aggarwal, C. Farley, B.A. Hageman, J.D. Batteas and C.M. Drain, Hierarchical Organization of a Robust Porphyrin Cage Self-Assembled by Hydrogen Bonds," *Chem. Comm.* **47** (2011) 7134-7136.

X. Hong, Z. Luo, and J.D. Batteas, "Enhanced Visible Light Absorption and Dopant Distribution of I- TiO<sub>2</sub> Nanoparticles Synthesized by a New Facile Two-Step Hydrothermal Method," *Journal Solid State Chemistry* **184** (2011) 2244-2249.

## **2010**

R.L. Jones, B.L. Harrod and J.D. Batteas, "Intercalation of 3-phenyl-1-propanol into OTS SAMs on Silica Nanoparticles to Create Self-Repairing Films for MEMS Lubrication," *Langmuir* **26** (2010) 16355-16361.

K. Cho, W.D. Kerber, S.-R. Lee, A. Wan, J.D. Batteas and D.P. Goldberg, "Preparation, Size Control, Surface Deposition, and Catalytic Reactivity of Hydrophobic Corrolazine Nanoparticles in an Aqueous Environment," *Inorg. Chem.* **49** (2010) 8465-8473.

M. Jurow, A.E. Schuckman, J.D. Batteas and C.M. Drain, "Porphyrins as Molecular Electronic Components of Functional Devices," *Coord. Chem. Rev.* **254** (2010) 2297-2310.

Y.-H. Chan, J. Chen, Q.-S. Liu, S.E. Wark, D.-H. Son and J.D. Batteas, "Ultrasensitive Copper(II) Detection Using Plasmon-Enhanced and Photo-Brightened Luminescence of CdSe Quantum Dots," *Anal. Chem.* **82** (2010) 3671-3678.

H. Fu, D. Policarpio, J.D. Batteas and D.E. Bergbreiter, "Redox-Controlled 'Smart' Polyacrylamide Solubility," *Polym. Chem.* **1** (2010) 631-633.

H. Fu, X. Hong, A. Wan, J.D. Batteas and D.E. Bergbreiter, "Parallel Effects of Cations on PNIPAM Graft Wettability and PNIPAM Solubility," *ACS Appl. Mater. Interfaces* **2** (2010) 452-458.

## **2009**

J. Chen, Y.-H. Chan, T. Yang, S.E. Wark, D.-H. Son and J.D. Batteas, "Spatially Selective Optical Tuning of Quantum Dot Thin Film Luminescence," *J. Am. Chem. Soc.* **131** (2009) 18204-18205.

T. Isaacson, D. Kosma, A.J. Matas, G.J. Buda, Y. He, B. Yu, A. Pravitasari, J.D. Batteas, R.E. Stark, M.A. Jenks and J.K.C. Rose, "Cutin Deficiency in the Tomato Fruit Cuticle Consistently Affects Resistance to Microbial Infection and Biomechanical properties, but not Transpirational Water Loss," *The Plant Journal* **60** (2009) 363-377. (Cover Article)

Y.-H. Chan, J. Chen, S.E. Wark, S.L. Skiles, D.-H. Son and J.D. Batteas, "Using Patterned Arrays of Metal Nanoparticles to Probe Plasmon Enhanced Luminescence of CdSe Quantum Dots," *ACS Nano* **3** (2009) 1735-1744.



Q. Liu, Z. Yan, N. L. Henderson, J.C. Bauer, D.W. Goodman, J.D. Batteas and R.E. Schaak, "Synthesis of CuPt Nanorod Catalysts with Tunable Lengths," *J. Am. Chem. Soc.* **131** (2009) 5720-5721.

R.L. Jones, N.C. Pearsall and J.D. Batteas, "Disorder in Alkylsilane Monolayers Assembled on Surfaces with Nanoscopic Curvature," *J. Phys. Chem. C.* **113** (2009) 4507-4514.

J. Chen, W.-S. Liao, X. Chen, T. Yang, S.E. Wark, D.H. Son, J.D. Batteas, and P.S. Cremer, "Evaporation-Induced Assembly of Quantum Dots into Nanorings," *ACS Nano* **3** (2009) 173-180.

K.-S. Liao, H. Fu, A. Wan, J.D. Batteas and D.E. Bergbreiter, "Designing Surfaces with Wettability That Varies in Response to Solute Identity and Concentration," *Langmuir* **25** (2009) 26-28.

### **2008**

K.-S. Liao, A. Wan, J.D. Batteas and D.E. Bergbreiter "Superhydrophobic Surfaces Formed Using Layer-by-Layer Self-Assembly with Aminated MWNTs," *Langmuir* **24** (2008) 4245-4253.

C. Xu, R.L. Jones and J.D. Batteas, "Dynamic Variations in Adhesion of Self-assembled Monolayers on Nanoasperities Probed by Atomic Force Microscopy," *Scanning* **30** (2008) 106-117.

Y.-H. Chan, A.E. Schuckman, L.M. Pérez, M. Vinodu, C.M. Drain and J.D. Batteas, "Synthesis and Characterization of Thiol Tethered Tri-pyridyl Porphyrin on Au(111)," *J. Phys. Chem. C* **112** (2008) 610-618.

### **2007**

M. Kadalbajoo, H. Suda, A. Opdahl, C.A. Kitchens, J. Garno, J. D. Batteas, M.J. Tarlov, and P. DeShong, "Oligosaccharide-Based Self-Assembled Monolayers (SAM): Evidence for Organized Monolayers and Bilayers," *Langmuir* **23** (2007) 700-707.

J.C. Garno, C.D. Zangmeister, and J.D. Batteas, "Directed Electroless Growth of Metal Nanostructures on Patterned Self-Assembled Monolayers," *Langmuir* **23** (2007) 7874-7879.

C.M. Mahoney, A.J. Fahey, G. Gillen, C. Xu, and J.D. Batteas, "Temperature-Controlled Depth Profiling in Poly(methylmethacrylate) (PMMA) using Cluster Secondary Ion Mass Spectrometry (SIMS): 2. An Investigation of Sputter-induced topography, chemical damage and depolymerization effects" *Anal. Chem.* **79** (2007) 837-845.

L.C. Teague, S. Banerjee, S.S. Wong, C.A. Richter, B. Varughese and J.D. Batteas, "Effects of Ozonolysis and Subsequent Growth of Quantum Dots on the Electrical Properties of Freestanding Single-Walled Carbon Nanotube Films," *Chem. Phys. Lett.* **442** (2007) 354-359.

### **2006**

J.C. Garno, C. Xu, J.D. Batteas and C.M. Drain, "Designing Supramolecular Porphyrin Arrays for Surface Assembly and Patterning of Optoelectronic Materials," ACS Symposium Series 928, pp. 168-183, Washington, DC **2006**.

J.D. Batteas and J.C. Garno, "Nanofabrication with Self-Assembled Monolayers by Scanned Probe Lithography," Applied Scanning Probe Methods Volume IV, B. Bhushan (ed.), Springer-Verlag, pp. 105 – 136, Heidelberg, Germany, **2006**.

C. Xu, T. Wu, J.D. Batteas, C.M. Drain, K.L. Beers and M.J. Fasolka, "Surface-grafted block copolymer gradients: Effect of block length on solvent response," *Appl. Surf. Sci.* **252** (2006) 2529-2534.

L.B. Picraux, C.D. Zangmeister, and J.D. Batteas, "Preparation and Structure of Low-density, Flat-Lying Decanethiol Monolayer from the Densely-packed, Upright Monolayer on Gold," *Langmuir* **22** (2006) 174-180.

J.M. Helt and J.D. Batteas, "Implications of the Contact Radius to Line-Step (CRLS) Ratio in AFM for Nanotribology Measurements," *Langmuir* **22** (2006) 6130-6141.

C. Xu, S. E. Barnes, T. Wu, D. A. Fischer, D. M. DeLongchamp, J. D. Batteas, K. L. Beers "Generation of Solution and Surface Gradients via Microfluidic Confinement: Fabrication of a Statistical Copolymer Composition Gradient" *Adv. Mater.* **18** (2006) 1427-1430.



C. Xu, T. Wu, J. D. Batteas, C. M. Drain, K. L. Beers, "Block Copolymer Brush Gradients, Combinatorial Platforms to Study Block Copolymer brush properties" *Macromolecules* **39** (2006) 3359-3364.

G. Gillen, J. Batteas, C.A. Michaels, P. Chi, J. Small, E. Windsor, A. Fahey, J. Verkouteren and K.J. Kim, "Depth profiling using C60+SIMS - Deposition and topography development during bombardment of silicon," *Appl. Surf. Sci.* **252** (2006) 6521- 6525.

C.M. Mahoney, A.J. Fahey, G. Gillen, C. Xu, and J.D. Batteas, "Temperature-Controlled Depth Profiling in Poly(methylmethacrylate) (PMMA) using Cluster Secondary Ion Mass Spectrometry (SIMS)," *Appl. Surf. Sci.* **252** (2006) 6502-6505.

R.W. Carpick, J.D. Batteas and Maarten P. de Boer, "Scanning Probe Studies of Nano-Scale Adhesion Between Solids in the Presence of Liquids and Monolayer Films," book chapter, in *Springer Handbook of Nanotechnology 2<sup>nd</sup> edition*, B. Bhushan (ed.), Springer-Verlag, Heidelberg, Germany, 951-979, **2006**.

### **2005**

J.M. Helt and J.D. Batteas, "Wear of Mica in Aqueous Solutions: Direct Observation of Defect Nucleation by AFM," *Langmuir* **21** (2005) 633-639.

C. Xu, T. Wu, C.M. Drain, J.D. Batteas and K.L. Beers, "Microchannel Confined Surface Initiated Polymerization," *Macromolecules* **38** (2005) 6-8.

J.D. Batteas and R.E. Stark, "Surface and Interfacial Studies of Plant Biopolymers by SPM and NMR," Woodhead Publishing Ltd., pp.580-608, Cambridge, UK **2005**.

L.C. Teague and J.D. Batteas, "Scanned Probe Microscopy Mediated Patterning of Metallic Nanostructures," *Advanced Engineering Materials* **7** (2005) 811-814.

C. Xu, T. Wu, Y. Mei, C.M. Drain, J.D. Batteas and K.L. Beers, "Synthesis and Characterization of Tapered Copolymer Brushes via Surface-Initiated Atom Transfer Radical Copolymerization," *Langmuir* **21** (2005) 11136-11140.

### **2004**

J.M. Helt, C.M. Drain and J.D. Batteas, "A Benchtop Method for the Fabrication of Nanowires on Polymer Surfaces," *J. Am. Chem. Soc.* **126** (2004) 628-634.

R.W. Carpick and J.D. Batteas, "Scanning Probe Studies of Nano-Scale Adhesion Between Solids in the Presence of Liquids and Monolayer Films," book chapter, in *Springer Handbook of Nanotechnology Handbook*, B. Bhushan (ed.), Springer-Verlag, Heidelberg, Germany, 605-629, **2004**.

C.M. Drain, G. Smeareanu, J.D. Batteas, S. Patel. "Self-assembled Porphyrin Arrays on Surfaces," In *Dekker Encyclopedia of Nanotechnology*, J.A. Schwartz, C.I. Contescu, K. Putyera, Eds.; Marcel Dekker, Inc.: Vol 5. 3481-3502. New York, **2004**.

J.M. Helt and J.D. Batteas, "Surface Chemistry," *Chemistry: Foundations and Applications*, Macmillan Reference, USA, J.J. Lagowski (ed.), Vol. 4: 185 – 189, **2004**.

J.M. Helt and J.D. Batteas, "Mica Surfaces: Charge Nucleation and Wear." In *Dekker Encyclopedia of Nanoscience and Nanotechnology*, James A. Schwarz, Cristian I. Contescu, and Karol Putyera, Eds.; Marcel Dekker, Inc.: Vol 3: 1947-1966, New York, **2004**.

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C.A. Hacker, C. Richter, K. Anderson, C. Zangmeister, J.C. Garno J.D. Batteas, L. Richter, R. van Zee and M. Marquez, "Structure and Chemical Characterization of Self-Assembled Mono-Fluoro-Substituted Oligo(phenylene-ethynylene) Monolayers on Gold," *Langmuir* **20** (2004) 6195-6205.

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D.E. Gardin, J.D. Batteas, M.A. Van Hove, and G.A. Somorjai, "Carbon, Nitrogen, and Sulfur on Ni (111): Formation of Complex Structures and Consequences for Molecular Decomposition," *Surf. Sci.* **296** (1993) 25-35.

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P.K. Catterjee, K. Kamioka, J.D. Batteas, and S.E. Webber, "Triplet-State Electron Transfer in Poly(methacrylic acid) with Covalently Bound Phenanthrene and Naphthalene," *J. Phys. Chem.* **95** (1991) 960-965.

J.D. Batteas, A. Harriman, Y. Kanda, N. Mataga, and A.K. Nowak, "Photoinduced Charge Separation in a Porphyrin-Tetraviologin Supramolecular Array," *J. Am. Chem. Soc.* **112** (1990) 126-133.

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## PRESENTATIONS

### Upcoming

“Architected Heterostructures of Porphyrins for Optoelectronic Devices,” 2<sup>nd</sup> funCOS International Workshop, Erlangen, Germany, November 17-19, 2019.

### Completed (160) - as of 8/29/19

“Friction and Mechanochemical Reactivity of 2D Nanomaterials,” 257<sup>th</sup> National American Chemical Society Meeting, August 25-29, 2019.

“Studies of Friction and Mechanically Driven Chemical Reactivity of 2D Nanomaterials,” UT – Austin, March 27, 2019.

“Studies of Friction and Mechanochemical Reactivity of 2D Nanomaterials,” Exxon-Mobil, December 14, 2018.

“Applications of 2D Nanomaterials for Controlling Friction,” STLE Tribology Frontiers, All Stars of Tribology PI Poster Session, October 29, 2018.

“Studies of Friction, Energy Dissipation and Chemical Reactivity of 2D Nanomaterials,” 256<sup>th</sup> National American Chemical Society Meeting, August 19-23, 2018.

“Reducing the Barrier: Driving Chemical Reactions on Surfaces with Force,” Gordon Research Conference on Tribology, June 24-29, 2018.

“Tribochemistry,” part of the Nanotribology short course at the 2018 STLE Annual Meeting in Minneapolis, MN, May 20-24, 2018.

“Controlling Friction, Energy Dissipation and Chemical Reactivity in 2D Nanomaterials,” APS/CNM Users Meeting, Argonne National Labs, May 7-9, 2018.

“Probing the Load/Strain Dependent Reaction of Perfluorophenylazide (PFPA) with Graphene,” 255<sup>th</sup> National American Chemical Society Meeting, March 18-22, 2018.

“2D or not 2D? Tribology, Energy and 2D Nanomaterials,” Hunter College, March 16, 2018.

“2D or not 2D? Tribology, Energy and 2D Nanomaterials,” CUNY-Advanced Science Research Center, March 15, 2018.

“2D or not 2D? Tribology, Energy and 2D Nanomaterials,” St. Edwards University, February 16, 2018.

“2D or not 2D? The Impact of Nanoscale Roughness on Adhesion and Friction of Graphene and MoS<sub>2</sub>,” 45<sup>th</sup> Conference on the Physical Chemistry of Surfaces and Interfaces, January 14-18, 2018.

“Controlling the Self-Assembly and Optoelectronic Properties of Porphyrin Nanostructures,” 45<sup>th</sup> Conference on the Physical Chemistry of Surfaces and Interfaces, January 14-18, 2018.

“2D or not 2D? The Impact of Nanoscale Roughness on Adhesion and Friction of Graphene and MoS<sub>2</sub>,” Sandia National Labs, October 19, 2017.

"Studies of the Dynamic Tribological Properties of 2D Nanomaterials," 6<sup>th</sup> World Tribology Congress, Beijing, China, September 18-22, 2017.

"Formation of Au Nanoring Arrays via Particle Lithography for Applications in Plasmonics," 254<sup>th</sup> National American Chemical Society Meeting, August 20-24, 2017.

"Self-assembly and Photophysical Properties of Porphyrin Nanofibers," 254<sup>th</sup> National American Chemical Society Meeting, August 20-24, 2017.

"The Influence of Nearest-Neighbor Interactions and Assembly Dynamics on the Transport Properties of Porphyrin Supramolecular Assemblies on Au (111)," Faraday Discussion on Complex Molecular Surfaces and Interfaces, July 24-26, 2017.

"Studies of the Dynamic Frictional Properties of 2D Nanomaterials," 253<sup>rd</sup> National American Chemical Society Meeting, April 2-6, 2017.

"Tuning Charge Transport in Supramolecular Assemblies of Porphyrins on Au," 253<sup>rd</sup> National American Chemical Society Meeting, April 2-6, 2017.

"2D or not 2D? The Impact of Nanoscale Roughness on Adhesion and Friction of Graphene," 253<sup>rd</sup> National American Chemical Society Meeting, April 2-6, 2017.

"Controlling Charge Transport Mechanisms by Tuning the Architectures of Supramolecular Assemblies," University of Strathclyde, Scotland, December 9, 2016.

"Controlling Charge Transport Mechanisms by Tuning the Architectures of Supramolecular Assemblies," Texas State University, October 17, 2016.

"2D or not 2D? Understanding How a Single Atomic Layer of Carbon Changes Friction," Ursinus College, September 23, 2016.

"2D or not 2D? Understanding How a Single Atomic Layer of Carbon Changes Friction," Dow Chemical, Collegeville, PA September 22, 2016.

"Studies of the Dynamic Tribological Properties of Graphene on Rough Surfaces," 71<sup>st</sup> Society of Tribologists and Lubrication Engineers Annual Meeting and Exhibition, May 15-19, 2016.

"Modulating Charge Transport Mechanisms by Tuning the Architectures of Supramolecular Assemblies," 251<sup>st</sup> National American Chemical Society Meeting, March 13-17, 2016.

"Pushing Electrons Around: Tuning Charge Transport Mechanisms Through Controlled Supramolecular Assembly," 43<sup>rd</sup> Conference on Physics and Chemistry of Surfaces and Interfaces, January 17-21, 2016

"Modulating Charge Transport Mechanisms by Tuning the Architectures of Supramolecular Assemblies," Pacifichem 2015, December 16-21, 2015.

"Studies on the Use of Atomically Thin Films for Controlling Friction and Adhesion at Interfaces," 62<sup>nd</sup> Annual American Vacuum Society International Symposium and Exhibition (AVS 2015), October 18-23, 2015.

"2D or not 2D? Understanding How a Single Atomic Layer of Carbon Changes Friction," Hope College, October 9, 2015.

"2D or not 2D? Understanding How a Single Atomic Layer of Carbon Changes Friction," Calvin College, October 8, 2015.

"Nanotribology, Where Chemistry and Mechanics Meet," 70<sup>th</sup> Society of Tribologists and Lubrication Engineers Annual Meeting and Exhibition, May 17-21, 2015.

"Mapping Pressure Distributions in Molecular Adlayers with Nanoscale Asperity-Asperity Contacts," 70<sup>th</sup> Society of Tribologists and Lubrication Engineers Annual Meeting and Exhibition, May 17-21, 2015.

"Friction Modification of Surfaces Using Graphene and Graphene Composite Materials," International Conference on Metallurgical Coatings and Thin Films, April 20-24, 2015.

"2D or no 2D? The Impact of Nanoscale Roughness and Substrate Interactions on the Tribological Properties of Graphene," Argonne National Labs CNM Workshop: Exploring the Flatland, May 12, 2015.

"Studies of Stimuli Responsive Polymer Composite Grafts by Colloidal Probe Microscopy," 249<sup>th</sup> ACS National Meeting of the American Chemical Society, March 24, 2015.

"The Influence of Molecular Connectivity and Nearest-Neighbor Interactions on the Charge Transport Properties of Porphyrin Assemblies on Surfaces," University of New Orleans, February 27, 2015.

"Influence of Molecular Connectivity and Nearest Neighbor Interactions on the Charge Transport Properties of Porphyrin Assemblies on Au Surfaces," Workshop on Light-Driven Processes for Bio-Inspired Materials, Rice University, December 13-15, 2014.

"REU Activities in Materials Chemistry at Texas A&M University," 2014 Materials Research Society Fall Meeting, November 30 – December 3, 2014.

"Research Experiences for Undergraduates at TAMU," Council on Undergraduate Research, Research Experiences for Undergraduates Symposium, October 26-28, 2014.

"Controlling Friction on the Nanoscale," Muhlenberg College, October 17, 2014.

"Tuning the Frictional Properties of Surfaces with Nanoscale Roughness Using SAMs and Graphene-SAM Composites," 248<sup>th</sup> ACS National Meeting of the American Chemical Society, August 10-14, 2014.

"Friction and adhesion in ultrathin films on surfaces with nanoscale roughness". Gordon Research Conference - Tribology, July 20-25, 2014.

"Nanotribological studies of silane and silane/graphene composite thin films on surfaces with nanoscale roughness," Silanes Workshop - ETH- Zurich, July 8-9, 2014.

"Tribological Studies of Friction and Adhesion in Nanoscaled Asperity-Asperity Contacts," Society of Tribologists and Lubrication Engineers (STLE), May 18-22, 2014.

"Tribological Studies of Friction and Adhesion in Nanoscaled Asperity-Asperity Contacts," BP-RSC Conference on Tribology, Wuhan and Shanghai, China, November 19-22, 2013. (Given by video)

"Friction and Adhesion in Nanoscaled Asperity-Asperity Contacts – Behavior of Molecular Adlayers and Graphene as Friction Modifiers on Rough Surfaces," University of Pennsylvania, October 10, 2013.

"Examining the Role of Load Dependent Bond Strain on Atomic Scale Defect Nucleation in Nanoscopic Contacts," 5<sup>th</sup> World Tribology Congress, Turino, Italy, September 8-13, 2013

“Studies of Charge Transport in Tunable Molecular Assemblies on Surfaces,” 245<sup>th</sup> National American Chemical Society Meeting, April 8, 2013.

“When Surfaces get Rough: Tribochemistry of Nanoscale Asperity-Asperity Contacts,” Texas Tech University, March 29, 2013.

“Studies of Charge Transport in Confined Molecular Assemblies,” ETH Zürich, March 5, 2013.

“Tuning Charge Transport in Porphyrin Assemblies on Metal and Graphene Surfaces” 68<sup>th</sup> Southwest Regional ACS Meeting,” November 4-7, 2012.

“Assembling on a Curve: Molecular Assemblies on Nanoasperities and the Impact of Surface curvature on Monolayer Structure and Friction,” 244<sup>th</sup> National Meeting of the American Chemical Society, August 19 – 23, 2012.

“Stimuli-responsive Surfaces: Hard, Soft or Indifferent Mechanics,” Gordon Research Conference on Tribology, July 8-13, 2012

“When Surfaces Get Rough: Tribochemistry of Nanoscale Asperity-Asperity Contacts,” Texas State University, April 9, 2012.

“Studies of Friction and Wear in Nanoscopic Contacts Modified by Mixed Monolayer Films,” Engineering Conferences International, Advances in Lubrication: Linking Molecular, Meso, and Machine Scales, Puntarenas, Costa Rica, January 8-13, 2012.

“When Surfaces Get Rough: Friction and Adhesion at Nanoscale Asperity-Asperity Contacts,” Portland State University, November 18, 2011.

“Electron Transport in Single Molecules and Ensembles of Porphyrins on Au Surfaces, Southwest Regional ACS Meeting,” Symposium Honoring Paul Barbara, November 11, 2011.

“Studies of Chemical Changes in Nanoscopic Contacts: Combined TERS and AFM Measurements,” FACSS 2011, October 4-6, 2011.

“Tales from the Nanoscale: Fabrication and Tuning of Quantum Dot Assemblies on Surfaces for Optoelectronics and Sensing,” Cameron University, September 22, 2011.

“Studies of Chemical Changes in Nanoscopic Contacts: Combined TERS and AFM Measurements,” Northwest Regional ACS Meeting, June 29 – 29, 2011.

“Tuning the Assembly of Porphyrin Nanowires,” 242<sup>nd</sup> National Meeting of the American Chemical Society, August 28 – September 1, 2011.

“Studies of Conduction in Confined Molecular Assemblies,” Johns Hopkins University, February 24, 2011.

“Studies of Conduction in Confined Molecular Assemblies,” University of Delaware, February 25, 2011.

“Coming to America, Graduate School Opportunities for International Students in the US,” 241<sup>st</sup> National Meeting of the American Chemical Society, March 26 – 30, 2011.

“Plasmon Enhanced Photoluminescence of QD Arrays,” PacifiChem 2010, December 15-20, 2010.



"Tales for the Nanoscale: Conduction in Confined Porphyrin Assemblies," Dickinson College, November 19, 2010.

"Tales from the Nanoscale: Patterning of QD Arrays for Chemical Sensing and Display Applications," Appalachian State University, October 19, 2010.

"Creating Nanoscale Assemblies of QDs on Surfaces for Chemical Sensing and Display Applications," Xavier University, September 16, 2010.

"AFM and IR Studies of Molecular Assemblies on Silica Nanoassemblies for Friction Modification," Society of Tribologists and Lubrication Engineers, May 16-20, 2010.

"Plasmon Enhanced Photoluminescence and Optical Tuning of QD Assemblies," University of Texas-Austin, May 7, 2010.

"The Graduate School Process," 239<sup>th</sup> National Meeting of the American Chemical Society, March, 21-25 2010.

"Fabrication and Optical Tuning of Nanoscale Quantum Dot Assemblies for Light Harvesting and Chemical Sensing," Louisiana State University, February 3, 2010.

"Creating well-defined molecular and colloidal assemblies with scanning probe techniques," MOEMS-MEMS Photonics West SPIE Conference, January 23-28, 2010.

"Fabrication and Optical Tuning of Nanoscale Quantum Dot Assemblies on Surfaces," Southeastern Louisiana University, December 4, 2009.

"Surface and Interfacial Studies of Plant Protective Membranes," Innovation Seminar, BASF, Cary, NC, November 20, 2009.

"Patterned Assemblies of Quantum Dot Arrays for Energy Transfer and Sensing Applications," Rice University, October 28, 2009.

"Patterned Assemblies of Quantum Dot Arrays for Energy Transfer and Sensing Applications," University of Minnesota-Duluth, September 18, 2009.

"Direct on chip synthesis of QD arrays for light harvesting and sensing applications," 238<sup>th</sup> National Meeting of the American Chemical Society, August, 16-20 2009.

"Patterned Assemblies of Quantum Dot Arrays for Energy Transfer and Sensing Applications," University of Texas at Dallas, April 3, 2009.

"Surface and Interfacial Studies of Plant Protective Membranes," 238<sup>th</sup> National Meeting of the American Chemical Society, March 22-26, 2009.

"Conduction in Confined Molecular Assemblies," 237<sup>th</sup> National Meeting of the American Chemical Society, March 22-26, 2009.

"Surface and Interfacial Studies of Plant Protective Membranes," Texas A&M University, February 11, 2009.  
"Patterning Nanoscale Test Arrays for Studies of Confined Molecular Structures," SPIE International Symposium on MOEMS-MEMS, January 24-29, 2009.

"Soft Lithographic Approaches to Patterning of Optoelectronics," 2008 Fall MRS Meeting, December 1- 5, 2008.

“Conduction in Confined Molecular Assemblies,” Texas A&M University, Physics Department Condensed Matter Seminars, November 5, 2008.

“Photopatterning of QD Arrays for Sensing and Optoelectronics,” Smith College, September 18, 2008.

“Modulating Friction, Adhesion and Wettability of Rough Surfaces” Gordon Research Conference on Tribology, July 5 – 11, 2008.

“Probing Molecular Conduction in Confined Nanoscopic Geometries,” Hunter College, June 4, 2008.

“Charge Transport in Porphyrin Assemblies on Au,” Columbia University, June 3, 2008.

“Molecular Conduction in Confined Geometries,” Central Michigan University, April 28, 2008.

“Defect Nucleation in Nanoscopic Contacts,” 235<sup>th</sup> National American Chemical Society Meeting, April 10, 2008.

“Chemistry in Confined Geometries,” Priestly Medal Award Symposium, American Chemical Society Meeting, April 6, 2008.

“So you think you want to go to graduate school?” Grad School Reality Check, 235<sup>th</sup> National American Chemical Society Meeting, April 5, 2008.

“Probing Molecular Assembly and Molecular Conduction in Confined Geometries,” University of California at Davis, March 28, 2008.

“Molecular Conduction in Confined Nanoscopic Geometries,” University of California at Berkeley, March 27, 2008.

“Probing Molecular Assembly and Adhesion in Nanoscale Asperity-Asperity Contacts,” Materials Research Society, San Francisco, CA, March 24-26, 2008.

“Molecular Conduction in Confined Geometries,” University of South Carolina, February 25, 2008.

“Defect Nucleation and Wear in Nanoscopic Contacts,” Southwest Regional Meeting of the ACS, November 5, 2007.

“Surface and Interfacial Studies of Plant Biopolymers,” Annual Technical Conference of the Society of Plastic Engineers, Cincinnati, OH, May 6-10, 2007.

“Tales from the Nanoscale: Organizing and Characterizing Molecular Assemblies for Nanodevices,” Texas Lutheran University, October 26, 2007.

“Soft Lithographic Approaches to Patterning of Metal Nanostructures on Surfaces,” 234<sup>th</sup> National ACS Meeting & Exposition, Boston, MA, August 19-23, 2007.

“Fabrication of Nanoscale Test Arrays for Molecule Conduction,” NanoSummit 2007, Texas A&M University, August 8, 2007.

“Fabrication of Nanoscale Test Arrays for Molecule Conduction,” Molecular Conduction Workshop, Purdue University, July 19, 2007.

“Tales from the Nanoscale: Organizing and Characterizing Molecular Assemblies for Nanodevices” Angelo State University, April 3, 2007.

"The Role of Interfacial Water in the Tribochemical Wear of Mica and Etching of GaAs Surfaces," 232<sup>nd</sup>, National American Chemical Society Meeting, September 12, 2006.

"Surface Chemistry in Confined Geometries," 232<sup>nd</sup>, National American Chemical Society Meeting, September 13, 2006.

"Patterning and Chemical Assembly on GaAs Surfaces for Electronics and Photonics Applications," Telluride Workshop on Functional Modification of Semiconductor Surfaces, July 30 – August 5, 2006.

"Defect Nucleation and Wear on Surfaces," Gordon Research Conference on Tribology, June 18-23, 2006.

"Nanopatterning of Surfaces," ANTEC 2006 New Technology Forum, May 7-10, 2006.

"SPM Patterning of Nanoscale Metallic Junctions," SPIE Defense and Security 2006 Symposium, April 20, 2006.

"Self-Organizing Nanoscale Materials and Devices for Molecular/Organic Electronics," Pacifichem 2005, December 15-20, 2005.

"A Combined Theory and STM Investigation of Charge Transport at Metal-Molecule Junctions," 229<sup>th</sup> National American Chemical Society Meeting, March 11-16, 2005.

"Patterning of Nanoscale Metallic Structures Using Automated Scanned Probe Lithography," 2004 MRS Fall Meeting, November 29 – December 3, 2004.

"Charge Transport in Alkanethiols and OPE's probed by STM," 2004 MRS Fall Meeting, November 29 – December 3, 2004.

"Interfacing with the Nanoscale: Approaches for Organizing Nanoscale Organic and Metallic Structures on Surfaces," Exxon/Mobil Corporate Research Labs, November 4, 2004.

"Interfacing with the Nanoscale: Approaches for Organizing Nanoscale Organic and Metallic Structures on Surfaces," Materials Sciences Division, Brookhaven National Labs, October 28, 2004.

"Charge Transport in Alkanethiols and Molecular Wires," Symposium on Nanoscience and Nanotechnology, 227<sup>th</sup> National American Chemical Society Meeting, March 28 – April 1, 2004.

"Synthesis and Transfer of Materials to and from Polymers (STOMP): A New Imprinting Method for Fabrication of Micro- to Nanoscale Structures on Surfaces," 227<sup>th</sup> National American Chemical Society Meeting, March 28 – April 1, 2004.

"Molecular Electronics Metrology," Drexel University, November 19, 2003.

"Organizing Nanoscale Devices on Surfaces," University of California at Berkeley, October 16, 2003.

"Self-Organizing Materials for Nanoscale Devices," University of California at Davis, October 14, 2003.

"Nanoscale Studies of Plant Protective Membranes," Interagency Workshop on Nanotechnology and the Environment: Applications and Implications, National Science Foundation, September 15-16, 2003.

"Scanned Probe Investigations of Proteins," Workshop on Tissue Engineering, NIST, August 4, 2003.

"Molecular Electronics," City College of NY IGERT Workshop on Nanoscale Materials and Devices, June 2, 2003.

"Direct Observation of the Tribochemical Restructuring of Mica Surfaces on the Atomic Scale," 225<sup>th</sup> National Meeting of the American Chemical Society, March 23-28, 2003.

"Adhesion and Friction," Workshop on Nanometrology, NIST, January 27-28, 2003.

"Tales from the Nanoscale: Atomic Level Studies of Friction and Wear of Mica," Long Island University-Brooklyn, October 29, 2002.

"Making Molecular Forces Work for you: Designing Self-Organizing Nanoscale Materials and Devices," Wesleyan University, April 26, 2002.

"Charge Nucleation at Mica Surfaces Studied by AFM," 223<sup>rd</sup> National ACS Meeting, April 7-11, 2002.

"Caution: Molecular Forces at Work," NIST, February 27, 2002.

"Studies of Molecular Forces at Heterogeneous Surfaces with AFM," Nanoscience in a Mega-City Symposium on Nanotechnology, CUNY-Hunter College, October 20, 2001.

"Bond Energies and Local Chemical Dynamics Probed by Force Microscopy," Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Annual Meeting, October 10, 2001.

"Probing Local Chemical Interactions and Bond Energies with AFM," 59th Annual Technical Conference of the Society of Plastics Engineers, May 6-10, 2001.

"Surface and Interfacial Studies of Plant Cuticular Membranes with AFM and NMR," Association of Women in Science, Philadelphia Section Meeting, March 28, 2001.

"Studies of Molecular Interactions at Native and Modified Silica Surfaces in Solution," University of Delaware, October 30, 2000.

"Quantifying Single Molecular Forces with AFM," CUNY-Brooklyn College, October 4, 2000.

"Influence of Water on the Nanomechanical Behavior of the Plant Biopolyester Cutin Studied by AFM and Solid-State NMR," 74<sup>th</sup> ACS Colloid and Surface Science Symposium, June 14-19, 2000.

"Silica Sol-Gel Chemistry at the Single-Bond Level," 74<sup>th</sup> ACS Colloid and Surface Science Symposium, June 14-19, 2000.

"A Particle Eye View of Bonding in Nanospheric Interfacial Contacts: Looking at Bonds One at a Time," CUNY-Hunter College, May 19, 2000.

"Understanding Molecular Interactions of Silica Nanoparticles for the Design of Sol-Gel Based Photonic Materials," University of Waterloo, April 13, 2000.

"A Look at Interactions in Colloidal Silica Sol-Gels from the Particle's Perspective: Counting Bonds in Nanoscale Contacts" Wayne State University, April 12, 2000.

"Probing Molecular Interactions at Nanospheric Silica Contacts in Aqueous Environments," 219<sup>th</sup> National American Chemical Society Meeting, Sci-Mix Symposium, March 21-24, 2000.

"Bonding and Interparticle Interactions in Silica Sol-Gels," CUNY-City College, February 28, 2000.

"Quantifying and Controlling Molecular Interactions of Silica Nanoparticles," Lehigh University, November 17, 1999.

"Probing Molecular Interactions at Nanospheric Silica Contacts," University of Maryland at College Park, October 28, 1999.

"Molecular Interactions at Silica Surfaces," 59<sup>th</sup> Annual Conference on Physical Electronics, July 6-9, 1999.

"Colloidal Interactions at Silica Surfaces," 73<sup>rd</sup> ACS Colloid and Surface Science Symposium, June 14-19, 1999.

"Adhesion and Wear of Colloidal Silica Probed by Force Microscopy," 217<sup>th</sup> National American Chemical Society Meeting, March 21-24, 1999.

"Probing Chemical Interactions Between Silica Nanoparticles by Force Microscopy," CUNY-Queens College, December 9, 1998.

"Using AFM to Examine Surface Chemical Interactions on Silicon Dioxide," Ursinus College, November 23, 1998.

"Chemical Interactions in Colloidal Silica Probed by Force Microscopy," 216<sup>th</sup> National American Chemical Society Meeting, August 23-27, 1998.

"Probing Chemical Interactions Between Colloidal Silica Nanoparticles with Force Microscopy," 58th Annual Conference on Physical Electronics, June 14-17, 1998.

"Structural Studies of Plant Surfaces Using Atomic Force Microscopy," Monsanto, St. Louis, MO, March 24, 1998.

"Probing Colloidal Interactions by Force Microscopy," Drexel University, February 4, 1998.

"New Directions for Scanning Probe Microscopy in Biology & Biophysics", Temple Univ., October 9, 1997.

"Scanning Force Microscopy of Plant Surfaces," 214<sup>th</sup> National American Chemical Society Meeting, Sci-Mix Symposium, September 7-11, 1997.

"Atomic Force Microscopy of Plant Fruit Cuticles", 213<sup>th</sup> National American Chemical Society Meeting, Sci-Mix Symposium, April 13-17, 1997.

"Vegetarian AFM", University of California at Berkeley, April 10, 1997.

"Atomic Force Microscopy of Polymer and Biopolymer Materials", University of Southern Mississippi, March 7, 1997.

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**FUNDING as PI/Co-PI to date****Current**

*Collaborative Research: Understanding and Tuning the Molecular Arrangement, Charge Storage Properties of Textured Graphene-Ionic Liquid Interfaces*

Agency: National Science Foundation

Total Award Amount: **\$217,172 (direct + indirect)**

Award Period: 6/15/2019 – 5/31/2022

*Planning Grant: Engineering Research Center for Tribology to Create Reliable, Efficient, Sustainable Transportation*

Agency: National Science Foundation (PI: R. Carpick, Co-PIs: J. Batteas, A. Martini, W. Sawyer)

Total Award Amount: **\$99,999 (direct + indirect)**

Award Period: 9/1/2018 – 8/31/2019

*Frictional Properties of Single and Few Layer MoS<sub>2</sub>*

Agency: NTESS, LLC - National Technology & Engineering Solutions of Sandia

Total Award Amount: **\$50,000 (direct + indirect)**

Award Period: 1/2/2019 – 9/1/2019

*Collaborative Research: Directing Charge Transport by Hierarchical Molecular Assembly*

Agency: National Science Foundation

Total Award Amount: **\$345,000 (direct + indirect)**

Award Period: 9/1/2016 – 8/31/2020 – N.C.E.

*Mastering Friction to Reduce Current and Future Energy Needs*

Agency: Texas A&M University – X-Grants Program

Total Award Amount: **\$500,000 (direct)**

Award Period: 7/1/2018 – 5/31/2021

*Force Driven Chemical Synthesis of Metal-Organic Frameworks*

Agency: TAMU Energy Institute (PI: J. Felts, Co-PI: J. Batteas)

Total Award Amount: **\$49,953 (direct)**

Award Period: 9/1/2018 – 8/31/2019

**Pending**

*CCI Phase 1: NSF Center for the Mechanical Control of Chemistry*

Agency: National Science Foundation

Total Award Amount: **\$1,800,000 (direct + indirect)**

Award Period: 9/1/2019 – 8/31/2022

Status: In review

**Past**

(#at NIST, \*at CUNY, all others at TAMU)

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*Enhancing in Situ Microscopy for Nanoscience and Nanotechnology at TAMU*

Agency: Texas A&M University – Research Development Fund

Total Award Amount: **\$1,568,996 (direct)**

Award Period: 6/1/2016 – 5/31/2019

*Frictional Properties of Single and Few Layer MoS<sub>2</sub>*

Agency: NTESS, LLC - National Technology & Engineering Solutions of Sandia

Total Award Amount: **\$44,440 (direct + indirect)**

Award Period: 6/1/2018 – 9/15/2018

*Studies on the Use of Atomically Thin Films for Controlling Friction and Adhesion at Interfaces*

Agency: National Science Foundation

Total Award Amount: **\$336,724 (direct + indirect)**

Award Period: 8/1/2014 – 7/31/2018

*REU Site: Biological, Green and Materials Chemistry Research at Texas A&M*

Agency: National Science Foundation

Total Award Amount: **\$300,000 (direct + indirect)** (PI: Holly Gaede, Co-PI: Batteas)

Award Period: 4/1/2014 – 3/31/2018

*Charge Transport in Confined Molecular Assemblies*

Agency: National Science Foundation

Total Award Amount: **\$334,000 (direct + indirect)**

Award Period: 8/1/2012 – 7/31/2016

*Development of Conductive Nanocoatings to Promote RF Shielding*

Agency: Nike IHM (PI: J. Grunlan, Co-PI: J. Batteas)

Total Award Amount: **\$79,090 (\$18,834 to Batteas, direct + indirect)**

Award Period: 1/15/2016 – 7/15/2016

*Studies of Friction and Adhesion in Nanoscale Asperity-Asperity Contacts*

Agency: National Science Foundation

Total Award Amount: **\$309,517 (direct + indirect)**

Award Period: 9/1/2011 – 8/31/2015

*REU Site: Biological, Environmental and Materials Chemistry Research at Texas A&M*

Agency: National Science Foundation

Total Award Amount: **\$300,071 (direct + indirect)** (PI: Holly Gaede, Co-PI: Batteas)

Award Period: 4/1/2011 – 3/31/2015

*Solvation Studies of Responsive Polymers in Solution and at Surfaces*

Agency: National Science Foundation (PI: Bergbreiter, Co-PI: Batteas)

Total Award Amount: **\$420,000 (\$187,000, direct + indirect to Batteas lab)**

Award Period: 9/1/2009 – 1/31/2013

*Collaborative Research: Conduction in Confined Molecular Assemblies*

Agency: National Science Foundation

Total Award Amount: **\$350,500 (direct + indirect)**

Award Period: 7/1/2009 – 1/31/2013

*Probing the Role of Surface Defects and Disorder on the Tribology of Nanoscopic Contacts*

Agency: National Science Foundation

Total Award Amount: **\$217,075 (direct + indirect)**

Award Period: 7/1/2008 – 6/30/2012

*Emerging Methodologies for Molecular Structure Determination of Biological Solids*

Agency: National Science Foundation

Total Award Amount: **\$512,137** (PI: Ruth Stark, Senior Personnel: Batteas, Cowburn & Stokes )

Award Period: 3/1/2008 – 2/28/2013

Note: This was an NSF Research Coordination Network project funded out of CCNY.



*REU Site: Biological, Environmental and Materials Chemistry Research at Texas A&M*  
Agency: National Science Foundation  
Total Award Amount: **\$272,635 (direct + indirect)** (PI: Holly Gaede, Co-PI: Batteas)  
Award Period: 3/1/2008 – 2/28/2012

*Fueling the Hydrogen Economy: Catalytic Approaches to Hydrogen Production*  
Agency: TAMU Energy Resources Program (PI: Goodman, Co-PIs Batteas and Cremer)  
Total Award Amount: **\$400,000** (\$133,335 direct to Batteas lab)  
Award Period: 5/1/2008 – 8/31/2010

*Loop Heat Pipe Failure Diagnosis*  
Agency: Boeing Corporation  
Total Award Amount: **\$28,638 (direct + indirect)**  
Award Period: 4/1/2007 – 12/31/2007

*Loop Heat Pipe Failure Diagnosis*  
Agency: Boeing Corporation  
Total Award Amount: **\$74,507 (direct + indirect)**  
Award Period: 4/1/2007 – 12/31/2007

*Probing Molecular Interactions and Defect Nucleation in Nanoscopic Contacts*  
Agency: The Robert A. Welch Foundation  
Total Award Amount: **\$150,000 (direct)**  
Award Period: 6/1/2006 – 5/31/2009

*Scanned Probe Lithography Approaches for the Fabrication of Plasmon Enhanced Quantum Optics*  
Agency: Texas Higher Education Board Advanced Research Program  
Total Award Amount: **\$100,000 (direct)**  
Award Period: 5/1/2006 – 1/31/2009

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*#In vivo 3-D Mapping of Nanoparticle Biomarkers in Cells and Tissues*  
Agency: NIST  
Total Award Amount: **\$100,000 (direct)**  
Award Period: 10/2004 – 9/2005

*\*Understanding the Hardening Syndrome of Potato (Solanum tuberosum L.) Tuber Tissue to Eliminate Textural Defects of Fresh and Fresh-Peel/Cut Products*  
Agency: US-Israeli BARD (PI: Ilan Shomer, J.D. Batteas, Co-PI with 2 others)  
Total Award Amount: **\$345,000** (\$27,000 direct to Batteas labs)  
Award Period: 11/2002 – 10/2005

*#Symposium on Applications of Scanned Probe Microscopy to Polymers*  
Agency: ACS-PRF  
Total Award Amount: **\$3,600 (direct)**  
Award Period: 4/2003 – 8/2003

*\*Development of Nanoscale Stochastic Methods for Smart Biochemical Assays*  
\*Agency: CUNY NIH PO1 Groundwork Grant  
Total Award Amount: **\$50,000 (direct)**  
Award Period: 6/2002 – 12/2003

*\*Acquisition of an X-Ray Photoelectron Spectrometer for Surface Chemical Analysis*  
Agency: National Science Foundation  
Total Award Amount: **\$125,155 (direct)**  
Award Period: 8/2001 – 7/2003

*\*ACS-PRF Summer Research Fellowship Supplement*

Agency: ACS-PRF

Total Award Amount: **\$8,000 (direct)**

Award Period: 5/2002 – 8/2002

*\*Advanced Methods of Surface Analysis for Polymer Chemistry*

Agency: NYS Graduate Research and Technology Initiative

Total Award Amount: **\$54,814 (direct)**

Award Period: 8/2001 – 7/2003

*\*Molecular Tribology Studies of Silica Asperity-Asperity Contacts*

Agency: PSC-CUNY Research Awards

Total Award Amount: **\$9,820 (direct)** Award Period: 7/2001 – 6/2003

*\*Research Experiences for Undergraduates in Polymers and Biopolymers*

Agency: National Science Foundation (PI: R.E. Stark, J.D. Batteas, Co-PI)

Total Award Amount: **\$180,000 (direct + indirect)**

Award Period: 2/2001 – 3/2004

*\*Influence of Environment on the Structure and Dynamics of Plant Cuticular Surfaces*

Agency: US Department of Agriculture

Total Award Amount: **\$110,000 (direct + indirect)**

Award Period: 9/2000 – 8/2003

*\*Probing Bonding Interactions in Silica Sol-Gels with Force Microscopy*

Agency: American Chemical Society-Petroleum Research Fund

Total Award Amount: **\$25,000 (direct)**

Award Period: 8/1999 – 8/2002

*\*Scanning Probe Technology Development for Materials Analysis*

Agency: NYS-Graduate Research and Technology Initiative

Total Award Amount: **\$37,800 (direct)**

Award Period: 8/1999 – 12/2000

*\*Probing Adhesion, Friction and Wear of Single Silica Nanoparticles*

Agency: PSC-CUNY Research Awards

Total Award Amount: **\$9,093 (direct)**

Award Period: 7/1999 – 12/2001

*\*Nanostructural Materials and Devices*

(PI: D.L. Akins, CUNY-City College, J.D. Batteas, Co-investigator with 10 others)

Agency: NSF-Integrated Graduate Education and Research Training (IGERT) Program

Total Award Amount: **\$2,742,000 (\$110,000 direct, to Batteas labs)**

Award Period: 8/1999 – 7/2004

*\*Probing the Microstructure and Mechanical Properties of Plant Protective Surfaces*

Agency: PSC-CUNY Research Awards

Total Award Amount: **\$5,917 (direct)**

Award Period: 7/1998 – 12/1999

*\*A Combined Atomic Force/Infrared Microscope (AFIRM) for Nanometer Scale Materials Analysis of Ultrathin Films*

Agency: Research Corporation: Research Innovation Award

Total Award Amount: **\$34,775 (direct)**

Award Period: 12/1997 – 12/2002

*\*Application of Force Microscopy to the Study of Plant Tissue Morphologies*

Agency: US Department of Agriculture

Total Award Amount: **\$50,000 (direct + indirect)**

Award Period: 9/1997 – 9/2000

*\*Probing the Microstructure and Mechanical Properties of Plant Protective Surfaces*

Agency: PSC-CUNY Research Awards

Total Award Amount: **\$5,000 (direct)**

Award Period: 6/1997 – 12/1998

*\*Tribology of Lubricant Additives Studied by Atomic Force Microscopy*

Agency: Exxon Chemical

Total Award Amount: **\$27,000 (direct)** Award Period: 4/1997 – 12/2003

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## PERSONNEL

### Graduate Students (total 28)

#### *Past*

Ms. Xuhui Quan (M.S. 1999)  
Dr. Tatiana Milic (co-advisor with C.M. Drain, Ph.D. 2002) - Senior Research Scientist, AMRI  
Dr. James Helt (Ph.D. 2005) – Staff Scientist – Aerospace Corporation  
Dr. Chang Xu (Ph.D. 2005) – Research Scientist - Global Research Group, Siberline Manufacturing Co.  
Mr. Ammon Pickett (M.S. 8/2008) – on faculty of Clearlake High School, Houston, TX.  
Dr. Yang-Hsiang Chan (Ph.D. 2010) – Associate Professor, National Sun Yat-Sen University  
Dr. Jixin Chen (Ph.D. 2010) – Assistant Professor, Ohio University  
Dr. Amanda Schuckman (Ph.D. 2010) – Hewlett Packard  
Lt. Ainsley Allen (M.S. 2011)-(joint student with Dave Bergbreiter) –Lab Chief, Air Force Petroleum Office  
Dr. Ryan Jones (Ph.D. 2011) – Total Petrochemical  
Dr. Albert Wan (Ph.D. 2011) –Principal Engineer, TSMC, Singapore  
Dr. Chi-Yuan Chang (Ph.D. 2013) – Intel Corporation  
Dr. Arika Pravitisari (Ph.D. 2013) – Intel Corporation  
Dr. Brad Ewers (Ph.D. 2014) – United Services Automobile Association  
Ms. Carrie Carpenter (M.S. 2014) – Adjunct Faculty, Indiana University Bloomington  
Dr. Stephanie Skiles (Ph.D. 2014) – Assistant Professor, University at Central Oklahoma  
Dr. Jessica Spear (Ph.D. 2015) – Materials Characterization Lab UIUC  
Dr. Alison Pawlicki (Ph.D. 2016) – Oak Ridge National Labs  
Dr. Meagan Elinski (Ph.D. 2018) – University of Pennsylvania  
Dr. Abhishek Parija (co-advisor with S. Banerjee, Ph.D. 2019) – Intel Corporation  
Dr. Cody Chalker (Ph.D. 2019) – University of California at Davis

#### *Current*

Ms. Zhuotong Liu ('14 – present)  
Ms. Maelani Negrito ('15 – present)  
Mr. Nate Hawthorne ('16 – present)  
Mr. Fanglue Wu ('16-present)  
Mr. Quentarius Moore ('17 – present) – DOE Computational Graduate Fellow  
Mr. Thomas Reyes ('18 – present) – NSF LSAMP Fellow  
Ms. Cindy Chen ('18 – present)

### Undergraduate Students (total 39)

#### **CUNY**

Ms. Elizabeth Corbo; Ms. Soa Dang; Ms. Racha Estaphen; Ms. Rima Estaphen; Ms. Janean Gamble (REU '02); Ms. Adrienne Gilbert; Mr. James Helt; Mr. Randy Jackson (REU '03); Ms. Carolyn Kitchens (REU '04 & '05); Ms. Susan Meserole; Ms. Denise Pate; Ms. Deena New; Mr. Joe Sclafani; Ms. Heather Sommers (REU '01).

#### **TAMU**

Ms. Katie Walton (TAMU Undergraduate Research Scholar, '06 – '07); Ms. Nicole Pearsall; Ms. Stephanie Skiles (REU '08); Ms. Jamie Wheeler (TAMU Undergraduate Research Scholar, '08 – '09); Ms. Kathy Webb (TAMU Undergraduate Research Scholar, '08 – '10); Ms. Bronwyn Harrod (REU '09 – '10); Mr. Ben Cotts (REU, '10); Mr. Daniel Bueso-Mendoza (LSAMP '10 – '11); Mr. Juan Callejas (REU '11); Mr. Robert Lye ('11 – '12); Ms. Megan Link (1/12 – 5/12); Ms. Meagan Elinski (REU '12); Ms. Kristin Light (1/13 – 7/13); Mr. Alexis Blanco (1/13 – 12/13); Mr. James Custer (REU '13); Mr. Jose Zavala (REU '14); Mr. Angel Villalpando ('15); Ms. Erin Avery (REU '15), Ms. Morgan Grandon (REU '16), Mr. Thomas Reyes (REU '17), Mr. Ben Menard ('15 – '18), Abby Starke ('16 – '18). Ms. Meredith Buzbee ('16 – '18). **Present:** Mr. Andrew Brown (REU '19); Mr. Noah Sheehan ('18 – present); Ms. Mckenzie Pedley ('18 – present)

## **Postdoctoral Fellows (total 10)**

### **CUNY**

Dr. Andrew Round ('98-'99) – Academic Fellow – University of East Anglia, UK  
Dr. Ning Chi ('99 – '02) – Adjunct Faculty, Essex County College

### **NIST**

Dr. Jayne Garno ('02 – '04) – Professor, Louisiana State University – PECASE Awardee  
Dr. Lucile Teague ('04 – '05) – Advanced MicroDevices  
Dr. Jamie Kim ('04 – '05) – Associate Professor, Buffalo State College  
Dr. Jeremy Beebe (1/05 – 8/05) – Research Chemist – Dow Chemical

### **TAMU**

Dr. Gang Liang ('05 – '06) – Facilities Manager, Rice University  
Dr. Qingsheng Liu (12/07-6/09) – Research Professor-James Madison University  
Dr. Xiaoting Hong (3/09 – 12/09) – Assistant Professor, South China Normal University  
Dr. Agustin Diaz (6/10 – 8/12) – Ford Foundation Fellow 2011 – 2012

## **Visiting Scholars (total 4)**

Professor Leihua Xu, China University of Mining and Technology (8/2015 – 8/2016)  
Professor Shengmao Zhang, Henan University (3/2015 – 6/2015)  
Dr. Ayelet Vilan, Weizmann Institute (7/2013 – 7/2014)  
Professor Eric Williamson, Ursinus College (Summer 2002)

## **Awards Received by my Students at TAMU**

### **2018**

#### Thomas Reyes

NSF LSAMP Bridge to the Doctorate Fellowship

#### Nathaniel Hawthorne

Best Poster Award, Gordon Research Conference on Tribology

### **2017**

#### Meagan Elinski

2017 Phil Gramm Doctoral Fellowship recipient

#### Quentarius Moore

Department of Energy Computational Science Graduate Fellowship (DOE-CSGF)

#### Thomas Reyes

Best Poster Award, 44<sup>th</sup> Annual (National Organization for the Professional Advancement of Black Chemistry and Chemical Engineers (NOBCChE) Conference, October 30-November 1, 2017.

### **2015**

#### Meagan Elinski

Honorable Mention for the 2015 NSF Graduate Research Fellowship

Nathaniel Hawthorne

First Year Chemistry Program Teaching Award – 2014

**2014**

Mr. Bradley Ewers

Beta Beta Chapter of the Phi Lambda Upsilon Honorary Chemical Society 2014 Sharon Dabney Memorial Scholarship. May 8, 2014.

Texas A&M Department of Chemistry Thomas J. Hairston Memorial Graduate Scholarship. May 8, 2014.

Texas A&M Association of Former Students Distinguished Graduate Student Award for Excellence in Teaching. April 27, 2014.

2014 U.S. Senator Phil Gramm Doctoral Fellowship for Excellence in Teaching and Research. April 10, 2014.

Meagan Elinski

Association of Former Students 2014 Graduate Merit Fellowship

Honorable Mention for the 2014 NSF Graduate Research Fellowship

Ms. Alison Pawlicki

Awarded an NSF Graduate Research Fellowship (2011 – 2014)

Jessica Spear

Graduate Student Poster Presentation Award from the Division of Colloids and Surface Science of the American Chemical Society, 247th National ACS Meeting, 247th ACS National Meeting of the American Chemical Society, March 16-20, 2014.

Best Graduate Student Poster Presentation Award- Gold Level, Society of Tribologists and Lubrication Engineers (STLE), May 18 – 22, 2014.

Stephanie Skiles

First Year Chemistry Program Teaching Award – 2014

**2013**

Mr. Bradley Ewers

1st Place Oral Presentation Student Research Week, Texas A&M University, College Station, TX, March 28, 2013.

Graduate Student Poster Presentation Award from the Division of Colloids and Surface Science of the American Chemical Society, 245th National ACS Meeting, New Orleans, LA. April 2013.

Texas A&M Department of Chemistry Upper Level Laboratory Teaching Award, College Station, TX, May 2013.

Texas A&M Department of Chemistry Travel Award, College Station, TX, May 2013.  
Selected speaker for the BASF-TAMU Graduate Student Research Symposium, College Station, TX,  
August 1, 2013.

Ms. Alison Pawlicki

Awarded an NSF Graduate Research Fellowship (2011 – 2014)

Ms. Stephanie Skiles

TAMU Student Research Week Award Winning Poster – 2nd Place

TAMU; March 2013 PLU Travel Award, TAMU, 2013

## **2012**

Dr. Agustin Diaz

Awarded a Ford Foundation Postdoctoral Fellowship (2011 – 2012)

Ms. Alison Pawlicki

Awarded an NSF Graduate Research Fellowship (2011 – 2014)

## **2011**

Carrie Carpenter

First Year Program Teaching Award, 2011

Dr. Agustin Diaz

Awarded a Ford Foundation Postdoctoral Fellowship (2011 – 2012)

## **2010**

Jixin Chen

Dow Scholarship for Graduate Chemical Research, 2010

## **2009**

Jixin Chen

E. Martell Travel Awards, Texas A&M University, 2009

Graduate Student Research and Presentation Travel Awards, Texas A&M University, 2009

Amanda Schuckman

Best Student Poster Award, COLL Division, 238<sup>th</sup> National American Chemical Society Meeting, March 23, 2009.

Selected for the 2009 US Senator Phil Gramm Doctoral Fellowship Award from Texas A&M University, April 2, 2009.

Albert Wan

E. Martell Travel Award, Texas A&M University, 2009.



Kathy Webb

"Characterization of Porphyrin Thiol Assemblies on Au(111)," *Texas A&M Student Research Week*, College Station, TX, United States, March 23-27, 2009 (Poster). *Awarded second place.*

Jamie Wheeler

*Texas A&M Student Research Week*, College Station, TX, United States, March 23-27, 2009 (Poster). *Awarded first place.*

## **2008**

Yang-Hsiang Chan

"Using patterned arrays of metal nanoparticles to probe plasmon enhanced luminescence of CdSe quantum dots on GaAs," Materials Characterization Facility Open House (TAMU), November 13, 2008 (Poster). *1<sup>st</sup> prize in the Poster Session*

"Using Patterned Arrays of Metal Nanoparticles to Probe Plasmon Enhanced Luminescence of CdSe Quantum Dots on GaAs," Student Research Week, March 24-28, 2008 (Poster). *2<sup>nd</sup> prize in the Poster Session and Session winner in Materials Science.*

## **2007**

Ryan Jones

Tribological Properties of Organosilane Self Assembled Monolayers in Silica Asperity-Asperity Junctions. Texas A&M Student Research Week, College Station, TX, United States, March 26-30, 2007 (Poster – *Won 1st prize*).

Amanda Schuckman

"Characterization of thiol tethered porphyrin derivatives on gold," Student Research Week, Texas A&M University, March 26-30, 2007 (Poster – *Won 3<sup>rd</sup> prize*).

"Surface organization of thiol tethered tri-pyridylporphyrin derivatives on gold," Industry-University Cooperative Chemistry Program, Texas A&M University, October 29-30, 2007 (Poster – *Selected for a top poster award*).

Albert Wan

"Effects of Surface Energy on the Size of Corrolazine Nanoparticles," Student Research Week, Texas A&M University, March 26-30, 2007 (Poster – *Won 2<sup>nd</sup> prize*).

## **2006**

Ryan Jones

First Year Program Teaching Award, 2006

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## TEACHING

### Courses taught at TAMU

#### ***Graduate Level***

CHEM 601 – Analytical Chemistry I (*taught 3 times*)

CHEM 602 – Analytical Chemistry II (*taught 5 times*)

CHEM 623 – Surface Chemistry (*taught 6 times*)

#### ***Undergraduate Level***

CHEM 415 – Analytical Chemistry (*taught 6 times*)

CHEM 315 – Quantitative Analysis I (*taught 4 times*)

CHEM 325 – Physical Chemistry Laboratory I (*taught 1 time*)

CHEM 326 – Physical Chemistry Laboratory II (*taught 1 time*)

CHEM 107 – General Chemistry for Engineers (*taught 1 time*)

CHEM 101 – General Chemistry for Majors (*taught 2 times*) – *current assignment*

#### **Other supervisory Responsibilities**

CHEM 318 – Quantitative Analysis Laboratory (*4 times*)

CHEM 491 – Research, undergraduate level (*14 times*)

CHEM 691 – Research, graduate level (*every semester*)

MSEN 691 – Research, graduate level (*every semester*)

#### **Classroom Innovations**

As part of a multi-faculty team, we have completely redesigned our undergraduate physical chemistry lab curriculum. Physical chemistry is renowned for being one of the more challenging courses for chemistry majors. One of the obstacles in engaging students in the physical chemistry laboratory courses difficulty is lack of direct visualization of key fundamental principles and the incorporation of modern instrumentation. Our redevelopment of the laboratory courses includes adopting experiments which better reflect the current state of physical chemistry research. This involves the utilization of modern techniques and instrumentation and the application to problems in material science, biological chemistry, environmental chemistry and other areas of current interest. To enhance the research based feel of the experiments, we have also moved to multi-week experiments, or modules, which permit ample time for the students to experience authentic inquiry and become familiar with equipment and techniques. Lastly, the students submit their written reports in scientific journal (Journal of Physical Chemistry) format.

As a component of this lab development, I introduced a 3-week module on imaging of surfaces: Visualization of Atoms and Molecules Using Scanning Tunneling Microscopy. This lab provides an introduction to the basic methodology of a scanning probe microscope and the utilization the technique to explore the structure and electronic properties of materials. Topics include imaging of graphite, metal, and semi-conductor surfaces, and charge transport through molecules on surfaces. Students examine tunneling distance dependence in air and through molecules with varying chain length. Also, modeled on our recent work on tunneling in porphyrins on surfaces (*J. Phys. Chem. C* 2008, 6110-6118), students measure the tunneling decay constant of single molecules. Our lab for this has was highlighted as a cover article and published in the *Journal of Chemical Education* in 2014. This lab has been adopted at UT-Austin and UCLA.

During the Chemistry Open House (annually in October), my lab sponsors a tour stop as part of the Open House where we engaged elementary school children in hands on experiments on nanoscience. In particular we developed a lab experiment for kids to use our atomic force microscope to pattern surfaces. We have modified this approach to incorporate a hands free interface using leap motion controller to allow children to “paint” nanoscale patterns on a surface using just a wave of their hand.

This demo was termed “The Atomic Canvas.” A video of this activity can be found at: <http://chem.tamu.edu/rgroup/batteas/WebLinked/LeapAFMvid/LeapAFMvid.html>

Building on this, I have now developed a Youth Adventure Program in Nanotechnology which was offered for the first time to 8<sup>th</sup>-11<sup>th</sup> graders in the Summer of 2016. Information on the camp can be found at: <http://www.youthadventureprogram.com/>. This first camp was run in conjunction with Dr. Jaime Grunlan. Funds for this were supported by the Office of the Chancellor for TAMUS. We expanded this camp to include the design and synthesis of nanomaterials for oil recovery (in 2017) and friction of materials (2018) in conjunction with Dr. Karen Wooley, and will continue the program in Summer 2019 with a focus on electronic materials.

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## SERVICE

### Departmental

Member, Chemistry Department Promotion and Tenure Committee (1/2016 – 1/2019)  
Faculty Advisor TAMU NOBCCChE Chapter (8/2011 – present)  
Member, Faculty Research Awards Committee (8/2015 – present)  
Chair, Analytical Chemistry Division (3/2011 – 8/2015)  
Member, Chemistry Department Executive Committee (1/2011 – 12/2014)  
Member, Chemistry Department Academic Operations Committee (3/2011 – 8/2015)  
Graduate Recruiting Coordinator-TAMU-Chemistry (9/2007 – 8/2011)  
Chair, Graduate Admissions and Review Committee (9/2007 – 8/2011)  
Member, Graduate Admissions and Review Committee (9/2006 – 8/2012)  
Co-PI TAMU NSF-REU in Chemistry (3/2008 – 4/2018)  
Member, Faculty Search Committee – Analytical and Physical (ad hoc)  
Student Awards Coordinator TAMU Industry-University Chemistry Cooperative Program (IUCCP)-2008  
Member, Shops Committee (9/2008 – 9/2009)  
Member, Graduate Curriculum Committee (5/2009 – 9/2015)

### University

Associate Dean for Research, College of Science (1/2017 – present)  
Member, University Research Council (1/2017 – present)  
Member, TAMU-JPL SURP Coordination Committee (11/2018 – present)  
Chair, Council of Principal Investigators (9/2016 – 1/2017)  
Vice Chair, Council of Principal Investigators (9/2015 – 8/2016)  
Executive Committee - Member, Council of Principle Investigators (9/2014 – 1/2017)  
Member, Council of Principal Investigators (9/2014 – 2017)  
Director, Materials Characterization Facility (9/2012 – 8/2017)  
Member, Research Development Fund Advisory Committee (2/2015 – 9/2016)  
Member, Materials Characterization Facility Oversight Committee (9/2013 – present)  
Member, Advisory Committee – Microscopy Center (9/2007 – 8/2010)  
Member, Executive Committee – Materials Science and Engineering Program (9/2010 – 9/2016)

**Student Thesis Committees on which I have served (excluding my own students)\***

*\* (Advisor and department noted for those outside of chemistry)*

Zuhair Al Yousef	(David Schechter—Petroleum Engineering)
Mohammed Almobarky	(David Schechter—Petroleum Engineering)
Johannes Alverz Ortiz	(David Schechter—Petroleum Engineering)
Stephanus Axnanda	(Wayne Goodman)
Luis DeJesus Baez	(Sarbjait Banerjee)
Aayushi Bajpayee	(Sarbjait Banerjee)
Edson Bedillo-Sosa	(Jorge Seminario—Chemical Engineering)
Chin-Yuan Chang	(Paul Cremer)
Li-Jung Chen	(Emile Schweikert)
Sangho Cho	(Karen Wooley)
Cristen Corry	(Matthew Sheldon)
Miguel Cruz	(David Russell)
Kyle Cummins	(Manuel Soriaga)
Yitong Dong	(Dong Hee Son)
Lacey Douglas	(Sarbjait Banerjee)
Amanda David-Lopez	(Kim Dunbar)
Luis De Jesus Baez	(Sarbjait Banerjee)
Lacey Douglas	(Sarbjait Banerjee)
Dinara Dussenova	(Jenn-Tai Liang—Petroleum Engineering)
Wade Eveland	(Simon North)
Asenath Francis	(Matthew Sheldon)
Sheng Geng	(Emile Schweikert)
Varun M. Gejji	(Sandun Fernando)
Tyler Guin	(Jaime Grunlan—Mechanical Engineering/Materials Science)
Kang Han Park	(David Schechter—Petroleum Engineering)
Nathaniel Hawthorne	(James Batteas)
Xingliang He	(Hong Liang—Mechanical Engineering)
Nicki Hogan	(Matthew Sheldon)
Greg Horrocks	(Sarbjait Banerjee)
Philip Imbesi	(Karen Wooley)
Alnald Javier	(Manuel Soriaga)
Hyunsook Jung	(Paul Cremer)
Dilshan K. Pathirana	(Marcetta Darensbourg)
Bryan Khai D. Ngo	(Melissa Grunlan)
Kang-Shyang Liao	(David Bergbreiter)
Phillip Lang	(David Russell)
Kevin Laux	(Raymundo Arroyove—Materials Science)
Zahery Levin	(Jaime Grunlan—Mechanical Engineering/Materials Science)
Hao Li	(Hongcai Zhou)
Yu-Chin Li	(Jaime Grunlan—Mechanical Engineering/Materials Science)
Andrew Liao	(Winfried Teizer—Materials Science)
Lauren Link	(Karen Wooley)
Chunming Liu	(Paul Cremer)
Matthew Lundwall	(Wayne Goodman)
Jonathan Lunn	(Dan Shantz—Chemical Engineering)
Jarett Martin	(Kim R. Dunbar)
Mahsa Minaeain	(Karen Wooley)
Brian Mosby	(Abe Clearfiled)
Thomas O'Loughlin	(Sarbjait Banerjee)
Johannes Ortiz	(David Schechter—Petroleum Engineering)
Ashvin Nagaraja	(Michael McShane)
Maelani Negrito	(James Batteas)

Abhishek Parija	(Sarbijit Banerjee)
Yerok Park	(Dong Hee Son)
David Parobek	(Dong Hee Son)
Kevin Pollack	(Karen Wooley)
Shivaranjan Raghuraman	(Jonathan Felts)
Kellie Seetho	(Karen Wooley)
Rivi Ratnaweera	(Matthew Sheldon)
Freddy Rodriguez-Ortiz	(Matthew Sheldon)
Maiti Sourav	(Dong Hee Son)
Yue Song	(Karen Wooley)
Joshua Silveria	(David Russell)
Eric Steffensmeier	(Janet Bluemel)
Jennifer Summerhill	(Karen Wooley)
Robert Werk	(David Russell)
Stacey Wark	(Dong Hee Son)
Tracey Wellington	(Winfried Tizer—Physics/Materials Science)
Brian Wu	(David Schechter—Petroleum Engineering)
You-Hao Yang	(Jaime Grunlan—Mechanical Engineering/Materials Science)
Fan Zhang	(David Schechter—Petroleum Engineering)
Jin Zhao	(Perla Balbuena—Chemical Engineering)
Yan Zhou	(Hong Liang—Mechanical Engineering)
Zhiao Zhou	(Wayne Goodman)

### **National/International**

Editorial Advisory Board, *ACS Central Science* (12/2014 – present)  
 Editorial Board, *RSC Advances* (4/2011 – present)  
 Associate Editor, *RSC Advances* (4/2011 – 4/2013)  
 Editorial Board Member, *ISRN Nanotechnology* (2011 – 2013)  
 Chair, Polymer Analysis Division, Society of Plastics Engineers (2006 – 2007)  
 Board of Directors, Polymer Analysis Division, Society of Plastics Engineers (2003 – 2008)  
 Chair, TAMU Section of the American Chemical Society (2008)  
*Ad Hoc* Panel Member and Keynote Speaker – American Chemical Society – Undergraduate Programs – *Grad School Reality Check* (2008 – 2010)

Fellow, Royal Society of Chemistry  
 Member, American Chemical Society  
 Member, American Association for the Advancement of Science  
 Member, National Organization for Black Chemists and Chemical Engineers

### Symposia Organized:

#### *Chair and Organizer:*

- 1) Fundamental Studies of Mechanochemical & Tribochemical Processes at Interfaces, 255<sup>th</sup> National Meeting of the American Chemical Society, March 18-22, 2018.
- 2) Crafting Chemical Communications, 252<sup>nd</sup> National Meeting of the American Chemical Society, August 21-26, 2016
- 3) Frontier Applications of Nanotechnology in Engineering Extracellular Matrices, 238<sup>th</sup> National Meeting of the American Chemical Society, March 22 – 26, 2009.
- 4) Symposium on Processes at Functional Plasmonic and Electronic Interfaces, 234<sup>th</sup> National Meeting of the American Chemical Society, August 19-23, 2007

- 5) Symposium on Scanning Probe Microscopy, Southwest Regional ACS Meeting, Houston, TX, October 21, 2006
- 6) Symposium on Polymer Surfaces and Interfaces, Society of Plastic Engineers, ANTEC 2006 May 7 – 10, 2006
- 7) Symposium on High Resolution Microscopy of Polymers, Society of Plastics Engineers, ANTEC 2004, May 16-20, 2004
- 8) Symposium on Optoelectronic Materials, Society of Plastic Engineers, ANTEC 2003, May 4-8, 2003
- 9) Symposium on Application of Scanning Probe Microscopy to Polymers, 225<sup>th</sup> National Meeting of the American Chemical Society, March 23-28, 2003

*Organizer:*

Symposium on Science, Technology and Applications of Dip-Pen Nanolithography, SPIE International Symposium on MOEMS-MEMS, January 24-29, 2009.

Session on Molecular Electronics in Symposium on Self-Assembled Photonics, PacifiChem, December 15-20, 2005.

*Publications Reviewer:*

Tribology Letters, Langmuir, J. Am. Chem. Society, ACS Nano, Analytical Chemistry, J. Phys. Chem., Scanning, Biophysical Journal, PNAS, J. Mater. Chem., Chemical Reviews, J. Polymer Sci., Solid State Chemistry, Surface Science, ACS Applied Materials and Interfaces, J. of Colloid and Interface Science, Nanotechnology, RSC Advances, Nature Communications.

*Proposal Reviewer:*

NSF, NIH, Research Corporation, ACS-PRF, PSC-CUNY Grants Program, DOE, DFG, Netherlands Organization for Scientific Research,